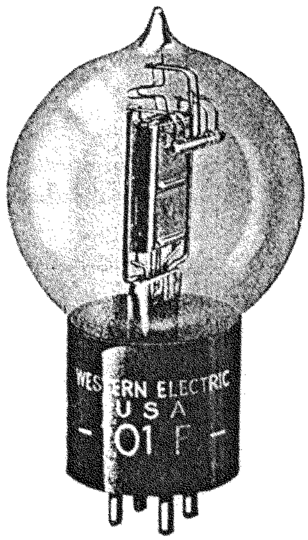
Western Electric

101F Vacuum Tube



Classification—Low-power, filamentary triode

Applications

Voice-frequency and carrier-frequency amplifier for telephone repeater equipment and other applications where small power outputs are required.

Modulator and demodulator in carrier systems.

Dimensions—Dimensions, outline diagrams of the tube and base, and the arrangement of the electrode connections to the base terminals are shown in Figures 1 and 2.

Base—Four-pin, bayonet type, having special contact metal at the ends of the contact pins.

Socket—Four-contact, bayonet-slot type, preferably provided with contact-metal contacts, such as the Western Electric 100L for front of panel mounting or 100R for rear of panel mounting.

Mounting Positions—Either vertical or horizontal. If mounted in a horizontal position, the plane of the filament, which is indicated in Figure 2, should be vertical.

Average Direct Interelectrode Capacitances

	A	B	C
Grid to plate, μμf	5.9	5.7	5.8
Grid to filament, μμf	5.2	5.6	6.1
Plate to filament, μμf	3.7	5.1	5.4

Column A—Based tube without socket.

Column B—Tube alone when measured in 100L socket mounted on a metal plate; socket and mounting plate connected to filament.

Column C—Tube alone when measured in 100R socket mounted in a metal plate; socket and mounting plate connected to filament.

Filament Rating

Filament current	0.50 ampere, d.c.
Nominal filament voltage	4.15 volts

The filament of this tube is designed to operate on a current basis and should be operated at a current not appreciably exceeding the rated value.

Characteristics—Grid-plate characteristics of a typical 101F tube are shown in Figure 3 for several values of plate voltage. The grid and plate voltages are measured from the negative end of the filament. Corresponding amplification-factor, plate-resistance, and transconductance characteristics are shown in Figures 4, 5 and 6, respectively, as functions of grid voltage. Plate characteristics are given in Figure 7 for several values of grid bias.

Operating Conditions and Output—Permissible operating grid and plate voltages are included within the area, ABCD, in Figure 3. A number of recommended and maximum operating conditions, represented by selected points within this area, and the corresponding values of amplification factor and plate resistance are given in the table below. Recommended conditions or others of no greater severity should be selected in preference to maximum conditions wherever possible. The life of the tube at maximum operating conditions may be shorter than at the recommended conditions.

The fundamental power output in milliwatts and the second and third harmonic levels in db below the fundamental, corresponding to the recommended and maximum operating conditions, are given in the latter part of the table for values of load resistance, R, both equal to and double the value of the plate resistance, r_p. The peak value of the sinusoidal input voltage, E_{gm}, which gives the indicated power output, P_m, and harmonic levels, F_{2m} and F_{3m}, in each case, is numerically equal to the grid bias. For a smaller input voltage, E_g, the approximate levels may be computed from the following relations:

$$P = P_m \left(\frac{E_g}{E_{gm}}\right)^2$$

$$F_2 = F_{2m} + 20 \log_{10} \frac{E_{gm}}{E_g}$$

$$F_3 = F_{3m} + 40 \log_{10} \frac{E_{gm}}{E_g}$$

Microphonic Noise—For a plate voltage of 130 volts, a grid bias of −8 volts, and a load resistance of 100,000 ohms, the mean microphonic output level of the 101F tube, measured in a laboratory reference test set, is 19 db below 1 volt. The range of levels of individual tubes extends from 8 to 30 db below 1 volt. Since microphonic noise output depends on the type and intensity of the mechanical disturbances which produce it, the values given here are useful chiefly for comparison with the levels of other types of tubes which have been tested in the same way.

TABLE

	Plate Voltage	Grid Bias	Plate Current	Amplification Factor	Plate Resistance	Load Resistance	Power Output	2nd Harmonic	3rd Harmonic
	Volts	Volts	Milliamperes		Ohms r_p	R	Milliwatts	db	db
Recommended Operating Conditions	100	− 4	5.5	6.5	5800	$R=r_p$	16	32	55
						$R=2r_p$	14	38	65
	130	−10	4.0	6.4	6900	$R=r_p$	80	22	36
						$R=2r_p$	75	28	46
	130	− 8	6.0	6.5	5800	$R=r_p$	62	26	46
						$R=2r_p$	55	33	55
	130	− 4	10.9	6.6	4600	$R=r_p$	20	37	60
						$R=2r_p$	18	43	65
	160	−14	4.8	6.4	6500	$R=r_p$	170	20	32
						$R=2r_p$	160	26	42
	160	−10	9.3	6.5	4900	$R=r_p$	120	28	47
						$R=2r_p$	110	34	55
Maximum Operating Conditions	160	− 8	11.9	6.6	4400	$R=r_p$	85	32	55
						$R=2r_p$	75	37	60
	190	−18	5.5	6.4	6300	$R=r_p$	275	17	29
						$R=2r_p$	255	24	37
	190	−16	7.5	6.5	5400	$R=r_p$	270	22	35
						$R=2r_p$	250	28	45
	190	−14	10.0	6.5	4800	$R=r_p$	250	25	43
						$R=2r_p$	215	31	50

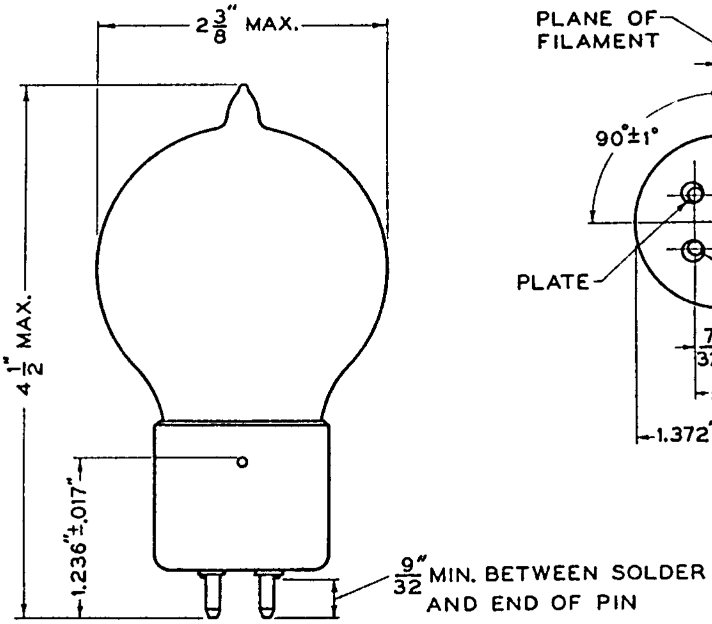


FIG. 1

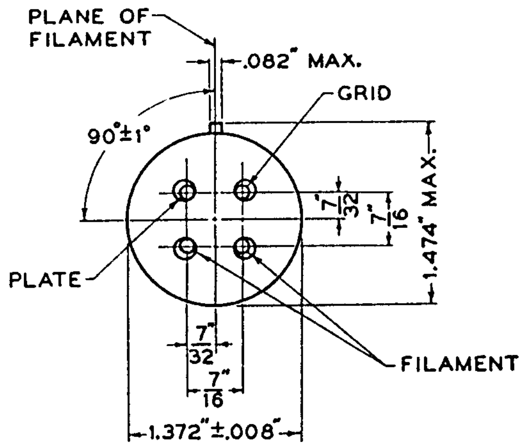


FIG. 2

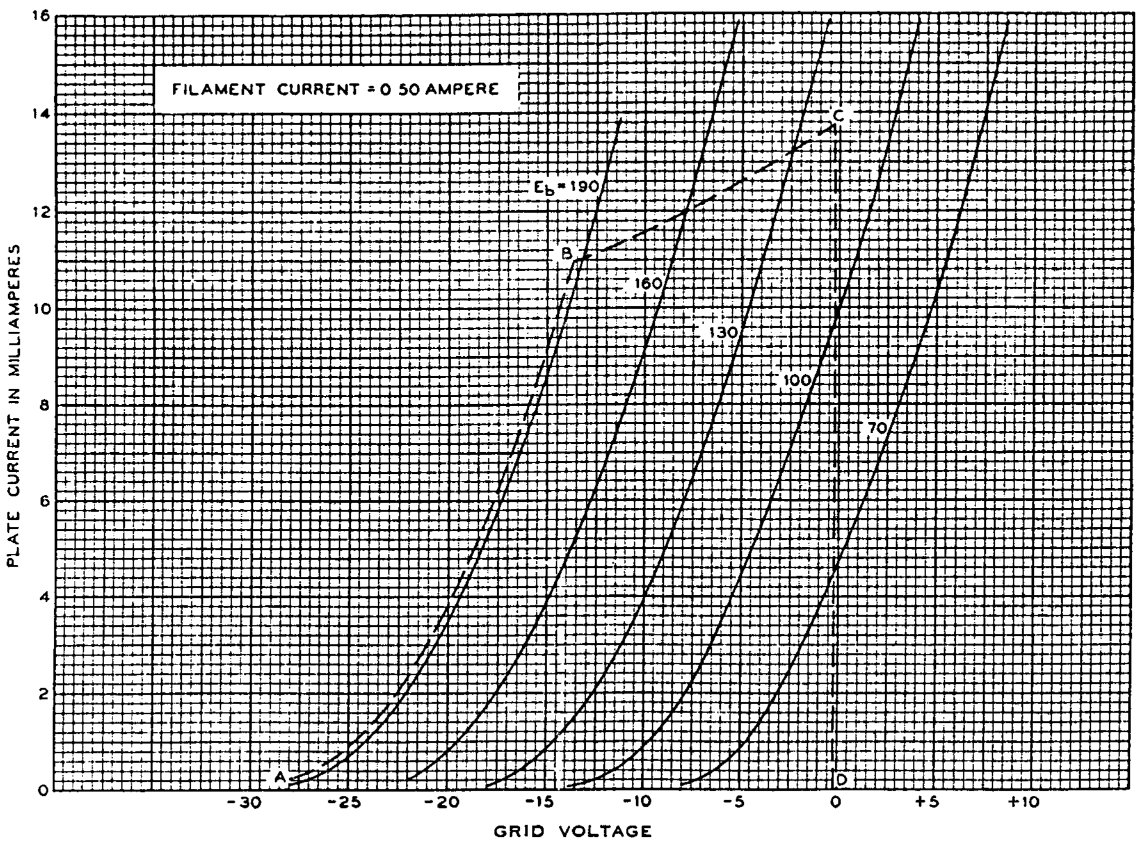


FIG. 3

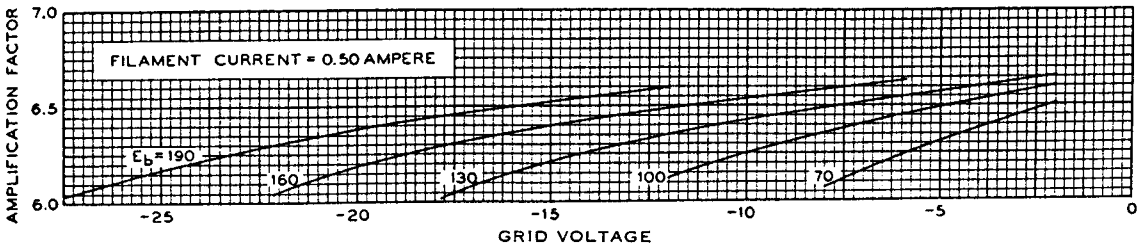


FIG. 4

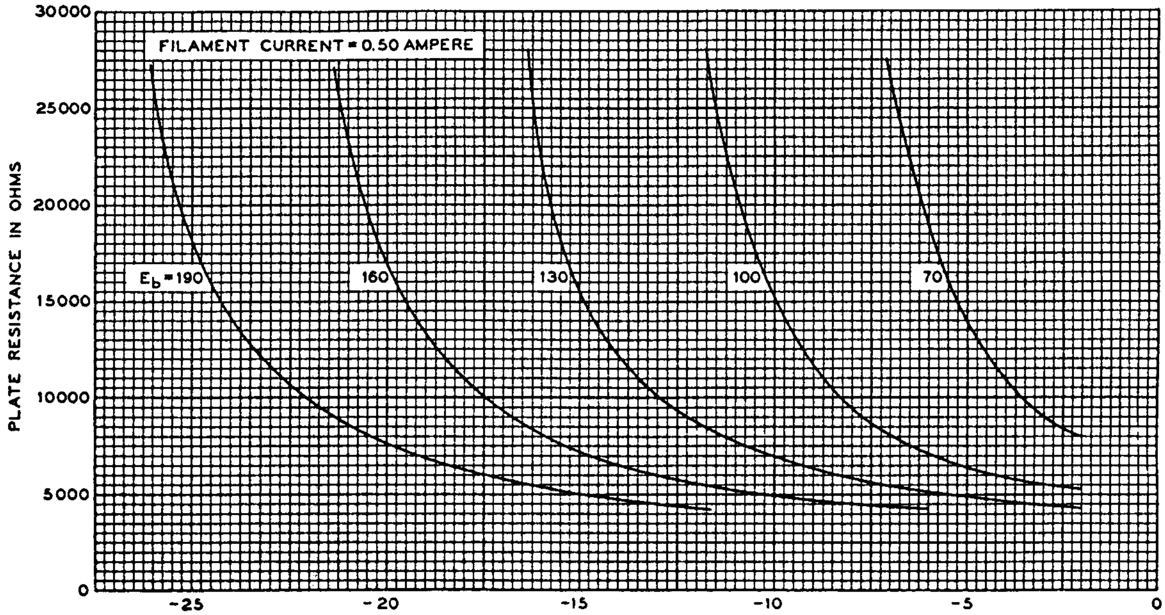


FIG. 5

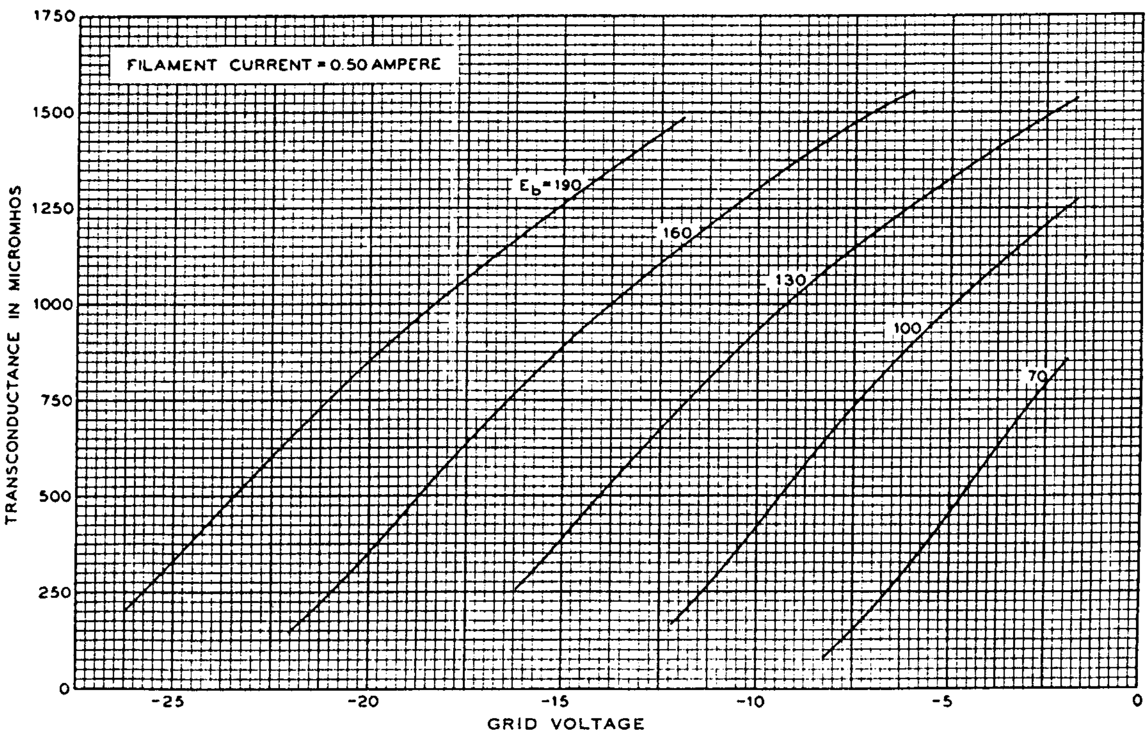


FIG. 6

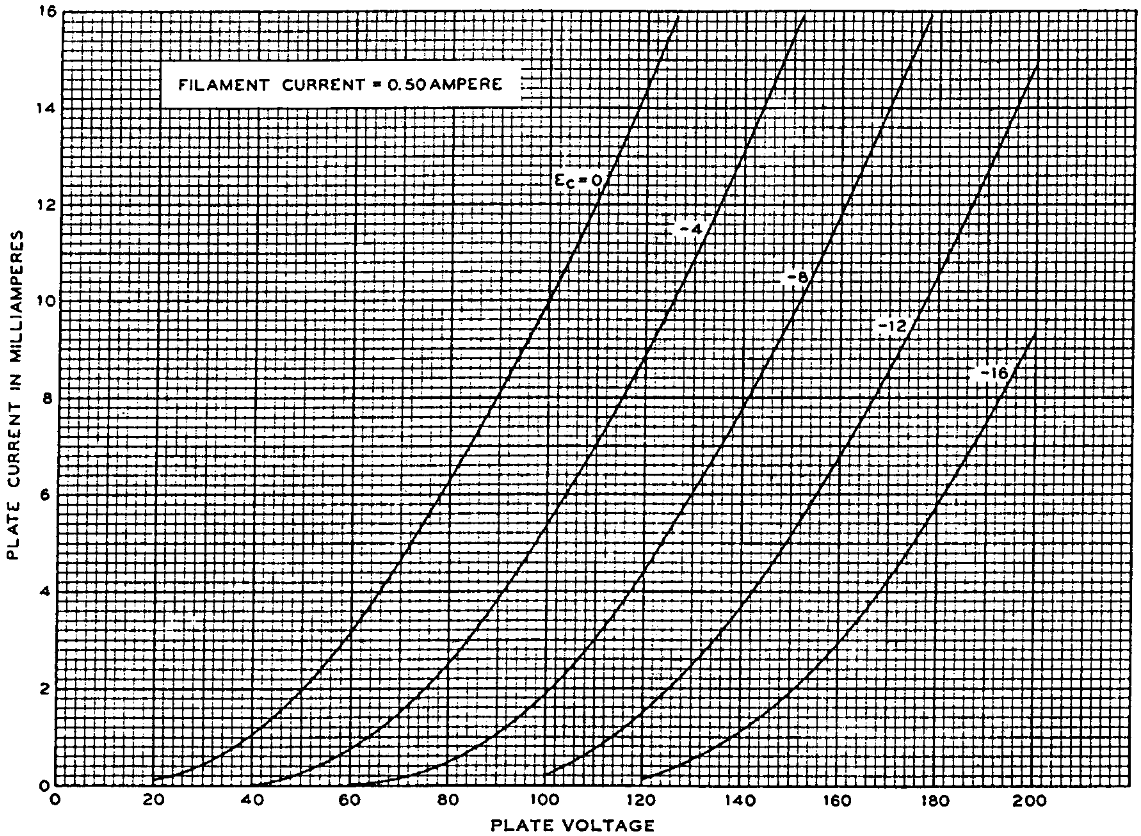


FIG. 7

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